



ISSN Print: 2394-7500
ISSN Online: 2394-5869
Impact Factor: 8.4
IJAR 2022; 8(10): 174-180
www.allresearchjournal.com
Received: 23-08-2022
Accepted: 25-09-2022

Rachna Arora
Department of Mathematics,
Desh Bhagat University,
Mandi Gobindgarh, Punjab,
India

Dr. Rama Kumari
Associate Professor,
Department of Mathematics,
Desh Bhagat University,
Mandi Gobindgarh, Punjab,
India

Demystifying mathematical anxiety among male and female students

Rachna Arora and Dr. Rama Kumari

Abstract

Mathematics acts as a tool for fostering the intellectual horizon of any society. Mathematics is the means of sharpening the individual's mind, shaping his reasoning ability and developing his personality. This study has been carried out with the help of descriptive researcher approach. This study has been carried out to examine the impact of gender on the mathematical anxiety. Keeping in view, the researcher found that there is significant impact of gender on the mathematical anxiety; male respondents were seen with low load of mathematical anxiety as compared to female respondents.

Keywords: Mathematical anxiety, among male and female students

Introduction

Mathematics plays an impotent role in the socio-economic development of country. Mathematics is a universal, utilitarian subject that is needed for everyone in their life. It is an integral part of the curriculum throughout the countries in the world. It is an interdisciplinary language and tool that is considered as one of the fundamentals in the formal educational system (Roy, 2011) ^[34]. He further stated that mathematics is the study of quantity, structure, space and change. It is as a human endeavour encompasses the mathematics of measurement time, distance and different system of distance measurement that developed throughout the world. Mathematics is a science about well-defined objects and notions which can be analysed and transformed in different ways using 'mathematical reasoning' to obtain conclusions about which we are certain (Sharma, 2018) ^[36]. It is an essential requirement in every field of intellectual endeavour and human development to cope with the challenges of life (Ihechukwu & Ugwuegbulam, 2016) ^[24]. Mathematics is an important subject with broad applicability to everyday life, yet mathematics is often considered as a difficult subject in schools (Kaur, 2017) ^[47]. As early as the 1st grade, students can start displaying negative attitudes towards learning mathematics and gradually develop it in the form of mathematical Anxiety (Hornigold, 2015) ^[21]. Moreover, it seems that the school has not given the special attention to classroom delivery and the approaches to teaching and learning of students with mathematics learning difficulty. On the other hand, students' performance in mathematics is decreasing gradually as the students' moves to the upper grades. Therefore from the above discussion it is evident that mathematical anxiety may be a feeling of tension, apprehension, or fear that interferes with math performance. An individual with math anxiety doesn't necessarily lack ability in mathematics; rather, s/he can't perform to her/his full potential thanks to the interfering symptoms of anxiety. The reasons behind such aspects like negative attitudes. Mathematical anxiety and decreasing students' performance on mathematics may be different prevailing factors. Among these different factors, somebody consider mathematics anxiety is one of the important factors. It is the universal belief about mathematics as a 'difficult subject' by perception. In Indian education system, most of the school level students, teacher as well as parents consider mathematics as a difficult subject. So, those students who have already conditioned their minds that mathematics is a difficult subject are usually not serious in the learning of mathematics and therefore perform poorly in mathematics tests and examinations (Ihendinihu, 2013) ^[48]. Mathematics can be a very interesting and fun provoking subject for those learners who can really enjoy their learning (Fu Sai & Chin Kin, 2017) ^[49]. On the contrary, mathematics can also be a frustrating subject for many children who have problems with computation and application (Chinn, 2015) ^[50].

Corresponding Author:
Rachna Arora
Department of Mathematics,
Desh Bhagat University,
Mandi Gobindgarh, Punjab,
India

This shows that, many people have mixed feelings about mathematics. Thus, many students feel mathematics as a boring and disengaging subject (Colgan, 2014) ^[51] and they hate mathematics, and try to avoid it by the cause of mathematics anxiety. Even teachers and parents have negative attitudes towards mathematics; it is expressed as a hard subject that is inaccessible, uninteresting and it is not for cool and engaging people and not for girls (Boaler, 2016) ^[52]. Of all the most important cause of poor performance in mathematics at school level may be the anxiety in mathematics. Thus the study can help the concerned teachers and the educational administrators to run and support the students who are suffering due to the lack of support and other resources, and the perceived barriers that impact on classroom instruction and supports. Mathematical anxiety, which is exhibited by many students, is the persistent, illogical, intense fear of not succeeding in mathematics. It is the belief that one is unable to handle the difficulty associated with learning mathematics. Many people incorrectly assume that math anxiety and an inability to be successful in mathematics are inherited from one's parents. Several legitimate factors contribute to, and increase the severity of, this perception. Mathematics anxiety is 'fear' of mathematics. It is usually defined as a persistent fear of mathematical problems in which the sufferer commits to great lengths in avoiding, typically disproportional to the actual danger posed, often being recognized as irrational. In the event the anxiety cannot be avoided entirely, the sufferer will endure the mathematical problem with marked distress and significant interference in social or occupational activities. For instance, gender and ethnic backgrounds are not determining factors in mathematical competence, but peers' and teachers' attitudes toward gender and ethnicity may increase or decrease one's confidence in mathematical skills. Keshavarzi and Ahmadi (2013) ^[29] stressed that if there was nothing done to curb mathematics anxiety, there would be a reduction in "national human resources in science and technology". Henrich and Lee (2011) ^[17] describe a person with this anxiety as one who may experience, among others, sweaty palms and increased heartbeat. They also note that it can be found at any stage of growth including in the unborn child. Ayotola & Adedeji (2009) ^[2] stated that the mathematics anxiety phenomenon was an endemic that negatively impacted on the teaching and learning of mathematics. In another related submission, they noted that "the mathematically anxious students might be expected to lack skills in understanding the condition of a problem and setting up of the solution".

Statement of the Problem: The statement of the research problem is reported as under:

Demystifying mathematical anxiety among male and female students

Objectives of the study: The purpose of this study given as under:

- 1) To explore the mathematical anxiety of male and female students.

Hypothesis: Based on richness background of the

knowledge the investigator speculated the research problem as under:

- 1) There no significant difference between male and female students on their mathematical anxiety.

Methodology and procedure: This study has been carried out with the help of descriptive research method.

- **Sample:** The total sample for this study consist of 800 respondents.
- **Sampling technique:** The required sample was selected with the help of random sampling technique.

Delimitations of the study: During the whole research process lot or constraints were faced by the investigator. However, investigator made ample efforts to delimit these constraints upto maximum extent. Consequently, the research delimited the proposed study to following domains:

- 1) The study will be delimited to Fatehgarh Sahib District of Punjab.
- 2) The study will be delimited to 800 hundred students with due representation of the gender and type of school
- 3) The study will be delimited respondents within the age group of 14-18 years reading in 11th and 12th class students only.

Statistical treatment: The collected data was put to suitable statistical treatment by using:

- a) Frequency distribution,
- b) Percentage
- c) Mean
- d) Standard deviation
- e) Independent 't' test.

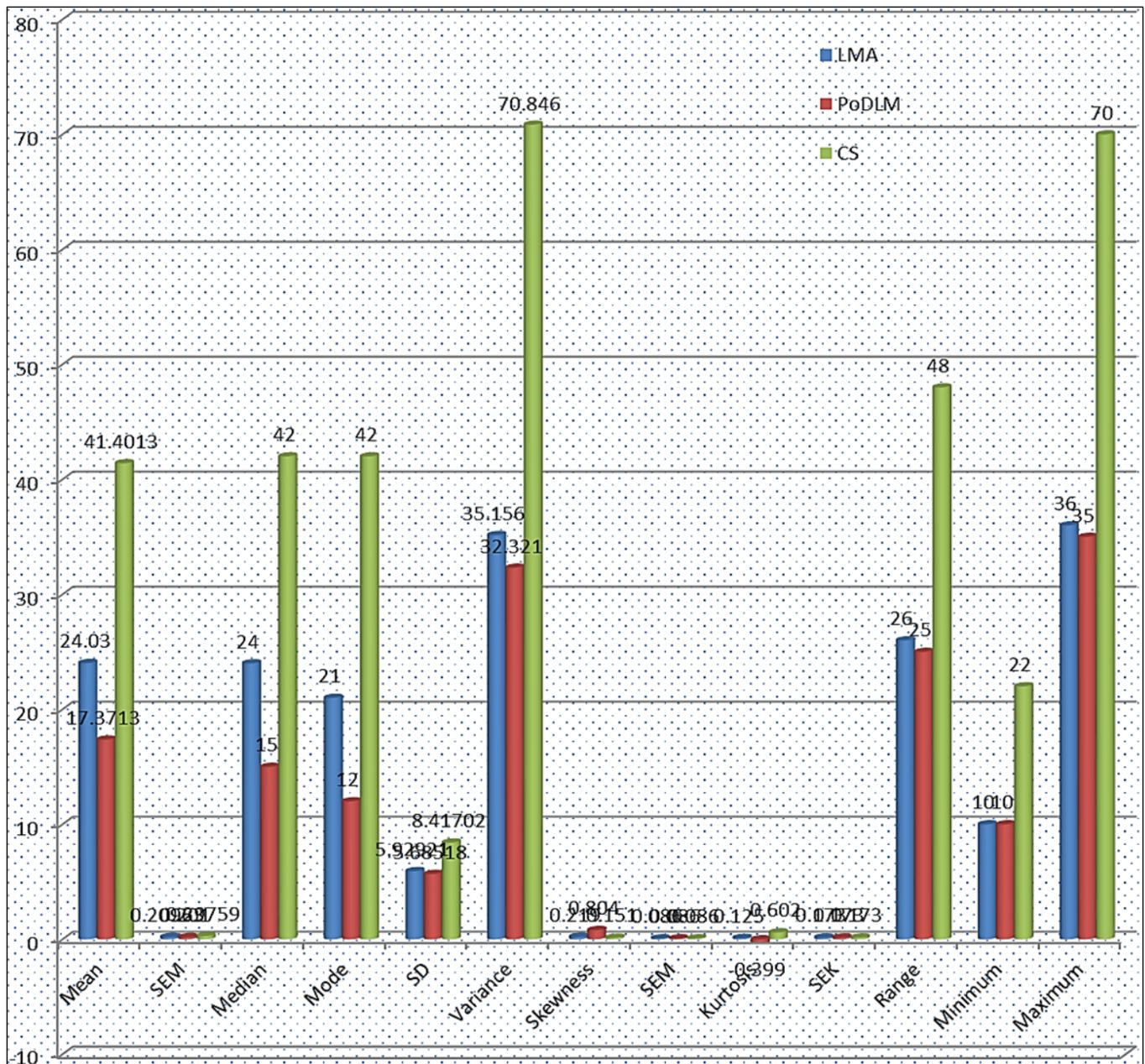
Analysis and Interpretation of the data: The data has been analysed with the help of descriptive and comparative analysis. The detailed analysis and interpretation is reported as under:

Table 1: Showing the descriptive analysis of the male and female students on the basis of the all the components of the mathematical anxiety. (N=800)

Composite Score		LMA	PoDLM	CS
N	Valid	800	800	800
	Missing	0	0	0
Mean		24.0300	17.3713	41.4013
SEM		.20963	.20100	.29759
Median		24.0000	15.0000	42.0000
Mode		21.00	12.00	42.00
SD		5.92921	5.68518	8.41702
Variance		35.156	32.321	70.846
Skewness		-.219	.804	.151
SEM		.086	.086	.086
Kurtosis		-.125	-.399	.602
SEK		.173	.173	.173
Range		26.00	25.00	48.00
Minimum		10.00	10.00	22.00
Maximum		36.00	35.00	70.00

Index

- LMA = Learning mathematical anxiety.
- PoDM = Perception of difficulty and motivation.



Index:

- LMA = Learning mathematical anxiety.
- PoDM = Perception of difficulty and motivation.

Fig 1: Showing the graphical illustration in consonance to descriptive analysis of the male and female on the basis of the all the components of the mathematical anxiety. (N=800)

Coming towards the first factor (Learning mathematical anxiety) of mathematical anxiety, the characteristics of the data indicate that both the categories of the respondents (male and female students) are 800 in number. Accordingly, no one is missing in this treatment. The perusal of the results indicate the mean attainment of composite ground of students has been seen is 24.0300. On the same factor, the standard error of the students was seen 0.20963. Going ahead the median of the students on the same factor has been seen 24.00 and the mode of the composite group of the students has been seen 21.00. The perusal of the same results indicates that the standard deviation of the students on their learning difficulty of mathematics has been seen 5.92922. In addition to same it has been seen that the variance has been contributed by students on the same factor with 35.156 with the skewness of -219. The results indicates that the standard error of the mean has been seen -0.86 with

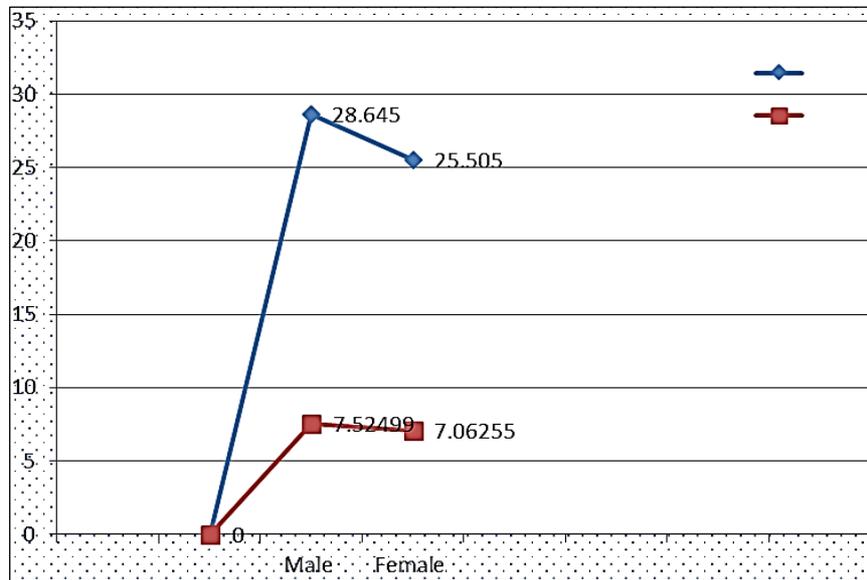
kurtosis of -1.25. The standard error of the kurtosis has been explored as 0.173. The difference between highest and the lowest score has been seen 26.00. The minimum score in the same distribution has been seen 10.00 and the maximum scoring distribution has been seen 36.00. Coming towards the 2nd factor (Perception of difficulty and motivation) of mathematical anxiety, the results indicate the mean attainment of composite ground of students has been seen is 17.3713. On the same factor, the standard error of the students was seen 0.20100. Going ahead the median of the students on the same factor has been seen 15.00 and the mode of the composite group of the students has been seen 15.00. The perusal of the same results indicates that the standard deviation of the students on their learning difficulty of mathematics has been seen 5.68518. In addition to same it has been seen that the variance has been contributed by students on the same factor with 32.321 with the skewness

of 0.804. The results indicates that the standard error of the mean has been seen -0.86 with kurtosis of -1.25. The standard error of the kurtosis has been explored as 0.173. The difference between highest and the lowest score has been seen 25.00. The minimum score in the same distribution has been seen 10.00 and the maximum scoring distribution has been seen 35.00. Coming towards the composite score of mathematical anxiety, the results indicate the mean attainment of composite ground of students has been seen is 41.4013. On the same factor, (overall score) the standard error of the students was seen 0.20100. Going ahead the median of the students on the same factor has been seen 42.0000 and the mode of the composite group of the students has been seen 42.00. The perusal of the same results indicates that the standard deviation of the students on their learning difficulty of mathematics has been seen 8.41702. In addition to same it has been seen that the variance has been contributed by students on the same factor with 7.846 with the skewness of 0.86. The results indicates that the standard error of the mean has been seen -0.86 with kurtosis of -602. The

standard error of the kurtosis has been explored as 0.173. The difference between highest and the lowest score has been seen 48.00. The minimum score in the same distribution has been seen 22.00 and the maximum scoring distribution has been seen 70.00.

Table 2: Showing the descriptive analysis of the male and female students on the basis of the all the components of the mathematical anxiety. (N=400 each)

Factor-I LMA		Male Students	Female Students
N	Valid	400	400
	Missing	0	0
Mean		20.2375	14.5525
Median		21.0000	14.0000
Mode		12.00	15.00
SD		5.88282	4.03832
Variance		34.608	16.308
Range		42.00	22.00
Minimum		10.00	11.00
Maximum		52.00	33.00
Sum		8095.00	5821.00



Index

- LMS = Learning mathematical anxiety.
- MS = Male Students.
- FS = Female students.

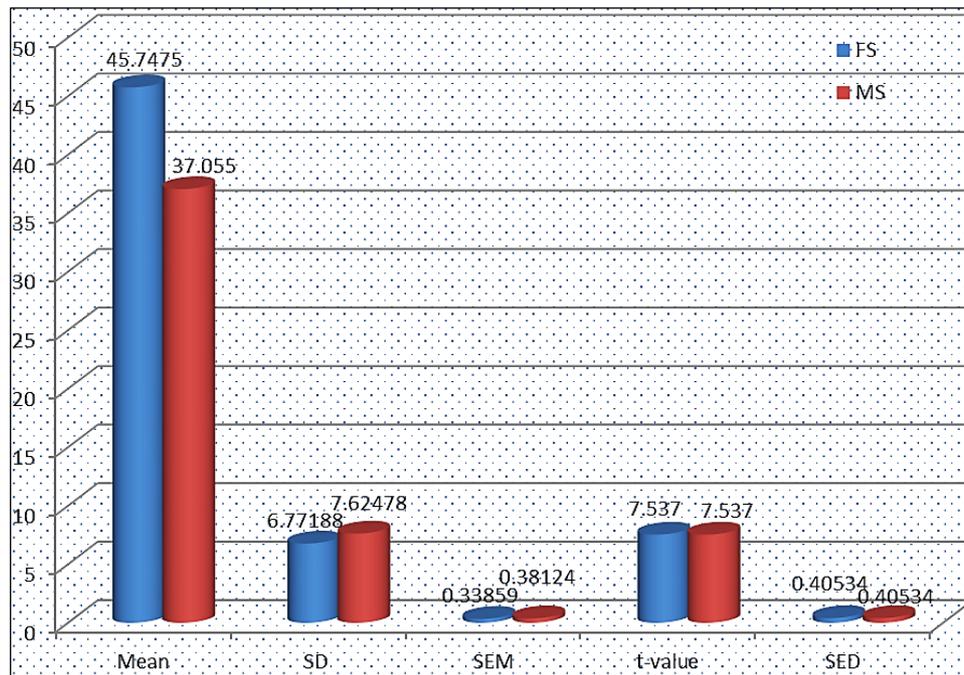
Fig 2: Showing the graphical representation on descriptive analysis of the male and female students on the basis of learning mathematical anxiety (Factor-I) of mathematical anxiety. (N=400 each)

Coming towards the first dimension (Learning mathematical anxiety) of mathematical anxiety of male and female students, the mean attainment of male students has been seen is 20.2375. Going ahead the median of the students on the same factor has been seen 24.00 and the mode of the composite group of the students has been seen 21.00. The results indicates that the standard error of the mean has been seen -0.86 with kurtosis of -1.25. The standard error of the kurtosis has been explored as 0.173. The difference between highest and the lowest score has been seen 42.00. The minimum score in the same distribution has been seen 10.00 and the maximum scoring distribution has been seen 52.00.

Looking towards their counterparts (FEMALE STUDENTS) it has been seen that their min achievement is 14.5525 and their median is 14.00. The most frequent score in their scoring distribution has been seen 15.00. Accordingly, the standard deviation of the female respondents has been found 4.03823. The occurrence of the variance has been seen 16.308. The range in the same scoring distribution of the students has been seen 22.00. Going ahead the maximum score in the distribution of the same series has been seen 33 and the minimum score in their scoring distribution has been seen 11.00.

Table 3: Showing the mean significant difference between male and female students on the basis of the composite score of the mathematical anxiety. (N=400 each)

CS	Category	N	Mean	SD	Std. Error Mean	t-value	Df	SED
Mathematical Anxiety	Female	400	45.7475	6.77188	.33859	7.537	798	.40534
	Male	400	37.0550	7.62478	.38124	7.537	686.622	.40534



Index:

- MS = Male Students.
- FS = Female students.
- ** = Significant at 0.05 level of confidence.

Fig 3: Showing the graphical illustration with regard to mean significant difference between male and female students on the basis of the composite score of the mathematical anxiety. (N=400 each)

The results reported in above table gives information about the mathematical anxiety of male and female students on composite level. The results indicate that the mean score of female students was seen 37.0557 while as the mean score of male students was seen 45.745. The standard deviation in case of male students has been seen 6.77188 and the standard deviation in the scoring set of female students has been seen 0.38124. Hence, the mean significant difference has been credited into the account of male students, as they were seen low mean achievers on the mathematical anxiety. When the both group of respondents were comparatively analysed with the help of independent ‘t’ test, the calculated ‘t’ value came out to be 7.53, which is not significant at 0.01 level of confidence. Therefore, from the above reported results, it can be inferred that the gender has significant impact on the level of mathematical anxiety. Male students were reported with low level of mathematical anxiety as compared to female students. In context to same, the status of the hypothesis is reported as under:

Indeed significant impact on the level of mathematical anxiety. Male students were reported with low level of mathematical anxiety as compared to female students. According the results reported above has been supported by the host of the researchers like;

Abdullah, K., and Ahmadi, S. (2013) ^[1], Ballado, R. S. (2014) ^[3], Chowdhury, M., Paul, H., & Das, A. (2007) ^[4], Ayotola, A., & Adedeji, T. (2009) ^[2], Duraisamy, N., & Duraisamy, P. (1999) ^[7], Durrani, N., & Tariq, V. (2009) ^[8].

Hypothesis: There exists significant difference between male and female students on their level of mathematical anxiety.

..... Status: Accepted

Conclusion

This study has been carried out to examine the impact of gender on the mathematical anxiety. Keeping in view, the researcher found that there is significant impact of gender on the mathematical anxiety; male respondents were seen with low load of mathematical anxiety as compared to female respondents.

References

1. Abdullah K, Ahmadi S. A comparison of mathematical anxiety among students by Gender. *Procedia Social and Behavioural Science*. 2013;83(1):542-546.
2. Ayotola A, Adedeji T. The Relationship between Gender, Age, Mental Ability, Anxiety, Mathematics Self-Efficacy and Achievement in Mathematics. *Cypriot Journal of Educational Sciences*. 2009;4(6):113-124.
3. Ballado RS. Mathematics Anxiety and Academic Achievement of Junior Pre-Service Teacher Education Students. *Eurasia Journal of Mathematics, Science & Technology on education*. 2014;5(2):335-345.
4. Chowdhury M, Paul H, Das A. The Impact of Top Management Commitment on Total Quality

- Management Practice: An Exploratory Study in the Thai Garment Industry. *Global Journal of Flexible Systems Management*. 2007;8(3):17-29.
5. Davis K, Pamela E. Mathematical anxiety among high cognitive and average cognitive ability children. *Journal of Family Psychology*. 2005;19(2):294-304.
 6. Dikkartinovez FT. An Examination on the Relation between Mathematical anxiety and Achievements of 5th, 6th, 7th and 8th grade student. *International mathematics forum*. 2012;7(60):2987-2994.
 7. Duraisamy N, Duraisamy P. Gender bias in the scientific and technical labour market: A comparative study of Tamil Nadu and Kerala. *Indian Economic Review*. 1999;34(2):149-189.
 8. Durrani N, Tariq V. Relationship Between undergraduates Mathematical Anxiety and their Attitude Towards development Numeracy Skills and 136 perceptions of Numerical Competence. *Journal of Family Psychology*. 2009;19(2):294-304
 9. Dursun S. Investigation of high school student's attitude and anxiety levels towards Mathematics in terms of some variables. *Academic Journals*. 2015;10(13):1773-1780.
 10. Dwivedi N, Gunthey R. Influence of Medium of Instruction on level of Academic Anxiety among school students. *Indian Educational Abstracts*. 2005;5(3):1-2.
 11. Erdogan A, Kesici S, Sahin I. Prediction of High School Students' Mathematics Anxiety by Their Achievement Motivation and Social Comparison. *Elementary Education Online*. 2011;10(2):646-652.
 12. Fotoples R. Overcoming math anxiety. *Journal of Family Psychology*. 2000;35(4):149-51.
 13. Fox L. Sex Differences: Implications for Programme Planning. *Journal for Research in Mathematics Education*. 1975;21(1):33-46.
 14. Frary RB, Ling JL. A factor-analytic study of mathematics anxiety. *Educational and Psychological Measurement, Journal for Research in Mathematics Education*. 1983;43(4):985-993.
 15. Hait A, Mishra A. A Study of fear of Mathematics among Students. *Open Journal of Applied and Theoretical Mathematics*. 2016;3(3):173-180.
 16. Harper NW, Daane CJ. Causes and reduction of math anxiety among students. *Journal of Action in Teacher Education*. 1998;19(4):29-38.
 17. Henrich A, Lee K. Reducing Mathematics Anxiety: Findings from Incorporating Service Learning into a Quantitative Reasoning Course at Seattle University. *Advances. Eurasia Journal of Mathematics, Science & Technology on education*. 2011;5(2):335-345.
 18. Hlalele D. Exploring Rural High School Learners' Experience of Mathematics Anxiety in Academic Settings. *South African Journal of Education*. 2012;32:267-278.
 19. Ho H, Senturk D, Lam AG, Zimmer JM, Hong S, Nakazawa YOSCY, *et al*. The Affective and Cognitive Dimensions of Math Anxiety: A Cross-National Study. *Journal for Research in Mathematics Education*. 2000;31(9):362-379.
 20. Hombre R. The nature, effect and relief of mathematics anxiety among students. *Journal for Research in Mathematics Education*. 1990;21(1):33-46.
 21. Hornigold. Total Quality Management and Theory of Constraints Implementation in Malaysian Automotive Suppliers: A Survey Result. *Total Quality Management, 17(2) Journal*. 2015;3(9):999-1020.
 22. Hosseini L, Khazali H. Comparing the levels of anxiety in male and female schools students. *Journal of Procedia-Social and Behavioural Sciences*. 2013;84(2):41-46.
 23. Hung RY, Lien BY, Fang S, McLean GN. Knowledge as a Facilitator for Enhancing Innovation Performance through Total Quality Management. *Total Quality Management*. 2010;21(9):425-438.
 24. Ihechukwu, Ugwuegbulam. Prevalence of Mathematical Anxiety among students. *Journal of Logical Trends*. 2016;14(10):20-38.
 25. Jackson CD, Leffinjewell RJ. The role of instructions in creating math anxiety in students from kindergarten through college. *Open Journal of Applied and Theoretical Mathematics*. 1999;92(7):583-586.
 26. Jain AK. Parametric and Non-Parametric Tests. *International Journal of Basic and Applied Research*. 2014;12(3):15-21.
 27. Karimi A, Venkatesan S. Cognitive Behaviour Group Therapy in Mathematics Anxiety. *Journal of the Indian Academy of Applied Psychology*. 2009;135(9):299-303.
 28. Karimi A, Venkatesan S. Mathematics Anxiety, Mathematics Performance and Academic Hardiness in High School Students. *International Journal of Education Science*. 2009;1(2):33-37.
 29. Keshavarzi A, Ahmadi S. A Comparison of Mathematics Anxiety among Students by Gender. *Procedia-Social and Behavioural Sciences*. 2013;83(9):542-546.
 30. Kuo T, Chang T, Hung K, Lin M. Employees' Perspective on the Effectiveness of the ISO 9000 Certification: A Total Quality Management Framework. *Total Quality Management*. 2009;20(8):1321-1336.
 31. Maloney EA, Ansari D, Fugelsang JA. Rapid Communication: The Effect of Mathematics Anxiety on the Processing of Numerical Magnitude. *The Quarterly Journal of Experimental Psychology*. 2011;64(9):10-16.
 32. Murat P. Pre-Service Teachers' Teaching Anxiety about Mathematics and Their Learning Styles. *Eurasia Journal of Mathematics, Science & Technology on education*. 2009;5(2):335-345.
 33. Pourmoslemi A, Erfani N, Firoozfar I. Mathematics Anxiety, Mathematics Performance and Gender Differences among Undergraduate Students. *International Journal of Scientific and Research Publications*. 2013;3(2):1-6.
 34. Roy LN. Mathematical Anxiety in post-modern era. *International Journal of Logical Analysis*. 2011;12(15):22-38.
 35. Sakthivel PB, Raju R. Conceptualizing Total Quality Management in Engineering Education and Developing a TQM Educational Excellence Model. *Total Quality Management*. 2006;3(3):913-934.
 36. Sharma NA. Mathematical Anxiety and gender. *Journal of Logical Trends*. 2018;14(10):20-38.
 37. Suhail A. Demystifying mathematical Anxiety among students. *International Journal of Applied Research*. 2021;7(8):169-172.
 38. Thoker AA. Understanding Research Ethics in the Digital Era. *Journal of Research Ethics*. 2018;14(10):12-38.

39. Thomas R. A Comparison between Male and Female Mathematics Anxiety at a Community College. *Eurasia Journal of Mathematics, Science & Technology on education*. 1998;5(2):335-345.
40. Whyte J, Anthony G. Math's Anxiety: The Fear Factor in the Mathematics Classroom. *New Zealand Journal of Teachers' Work*. 2012;3(4):6-15.
41. Woodard T. The effects of math anxiety on Post-Secondary development students as related to achievement, gender and age. *Open Journal of Applied and Theoretical Mathematics*. 2004;9(1):1-5.
42. Yap KC, Wong CL. Assessing Conceptual Learning from Quantitative Problem Solving of a Plane Mirror Problem. *Journal of Physics Education*. 2007;42(1):50-56.
43. Yeo WL, Tan CK, Lew SL. Mathematics Anxiety among Male and Female Students. *International Journal of Social, Behavioural, Educational, Economic research*. 2015;9(3):2830-2835.
44. Yucatan H, Kasapoglu L. Eighth grade student's attitude, anxiety and achievement pertaining to mathematics lessons. *Procedia-social and Behavioural Sciences*. 2012;46(3):162-171.
45. Yuksel SF. Mathematical Anxiety among 4th and 5th Grade Turkish Elementary School Student's. *International Electronic Journal of Mathematics Education*. 2008;3(3):179-189.
46. Zakaria E, Nordin MN. The effects of mathematical Anxiety on matriculation students as related to motivation and achievement. *Journal of Mathematics, Science & Technology Education*. 2007;4(1):27-30.
47. Kaur G. The importance of digital marketing in the tourism industry. *International Journal of Research-Granthaalayah*. 2017 Jun;5(6):72-77.
48. Ihendinihu UE. Enhancing mathematics achievement of secondary school students using mastery learning approach. *Journal of emerging trends in educational research and policy studies*. 2013 Dec 1;4(6):848-854.
49. Fu SH, Chin KE. An online survey research regarding awareness of dyscalculia among educators in Sandakan district, Sabah. *International Journal of Academic Research in Progressive Education and Development*. 2017;6(2):1-0.
50. Chinn SB, Myers JN. Oral cavity carcinoma: current management, controversies, and future directions. *Journal of clinical oncology*. 2015 Oct 10;33(29):3269.
51. Chave J, Réjou-Méchain M, Búrquez A, Chidumayo E, Colgan MS, Delitti WB, *et al.* Improved allometric models to estimate the aboveground biomass of tropical trees. *Global change biology*. 2014 Oct;20(10):3177-90.
52. Boaler J, Chen L, Williams C, Cordero M. Seeing as understanding: The importance of visual mathematics for our brain and learning. *Journal of Applied & Computational Mathematics*. 2016 Nov;5(5):1-6.